

Claims

- 1 1. A computer memory structure for parallel computing comprising:
- 2 a first level of hierarchy comprising a plane, the plane containing a thread which
- 3 represents an independent flow of control managed by a program structure, a
- 4 heap portion for data structure, a stack portion for function arguments, and
- 5 local variables and global data accessible by any part of said program structure;
- 6 and
- 7 a second level of hierarchy comprising a space, the space containing two or more of
- 8 said planes, the planes in the space containing said program structure, the space
- 9 further containing common data accessible by said program structure between
- 10 each of the planes.
- 1 2. The memory structure of claim 1 further comprising a third level of hierarchy
- 2 comprising two or more of said spaces, the spaces containing the same or different
- 3 program structures, and common data accessible by the program structure between
- 4 each of the spaces.
- 1 3. The memory structure of claim 2 wherein the third level of hierarchy contains
- 2 different program structures.
- 1 4. The memory structure of claim 2 wherein the third level of hierarchy contains
- 2 the same program structures.
- 1 5. The memory structure of claim 2 wherein the program structure comprises a
- 2 library of programs and further including a function table for each space, the function
- 3 table being adapted to exchange services with the library in each space.
- 4 6. A computer memory structure for parallel computing comprising:

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5 a first level of hierarchy comprising a plane, the plane containing a thread which
6 represents an independent flow of control managed by a program structure, a
7 heap portion for data structure, a stack portion for function arguments, and
8 local variables and global data accessible by any part of said program structure;
9 a second level of hierarchy comprising a space, the space containing two or more of
10 said planes, the planes in the space containing said program structure, the space
11 further containing common data accessible by said program structure between
12 each of the planes; and
13 a third level of hierarchy comprising two or more of said spaces, the spaces
14 containing the same or different program structures having a library of
15 programs, and common data accessible by the program structure between each
16 of the spaces.

1 7. The memory structure of claim 6 wherein the third level of hierarchy contains
2 different program structures.

1 8. The memory structure of claim 6 wherein the third level of hierarchy contains
2 the same program structures.

1 9. A computer program product for parallel computing comprising a computer
2 usable medium having computer readable code embodied in said medium, said
3 computer code defining computer memory structure including:

4 a first level of hierarchy comprising a plane, the plane containing a thread which
5 represents an independent flow of control managed by a program structure, a
6 heap portion for data structure, a stack portion for function arguments, and
7 local variables and global data accessible by any part of said program structure;
8 and

9 a second level of hierarchy comprising a space, the space containing two or more of
10 said planes, the planes in the space containing said program structure, the space
11 further containing common data accessible by said program structure between
12 each of the planes.

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1 10. The computer program product of claim 9 wherein the memory structure further
2 includes a third level of hierarchy comprising two or more of said spaces, the spaces
3 containing the same or different program structures, and common data accessible by the
4 program structure between each of the spaces.

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11 11. A method of parallel processing comprising:
12 providing a computer memory structure having a first level of hierarchy comprising
13 a plane, the plane containing a thread which represents an independent flow of
14 control managed by a program structure, a heap portion for data structure, a
15 stack portion for function arguments, and local variables, and global data
16 accessible by any part of said program structure; and a second level of
17 hierarchy comprising a space, the space containing two or more of said planes,
the planes in the space containing said program structure, the space further
containing common data accessible by said program structure between each of
the planes;
employing a first thread managed by said program structure in a first plane in said
space and accessing data in the first plane and common data between each of the
planes; and
employing a second thread managed by said program structure in a second plane in
said space and accessing data in the second plane and common data between
each of the planes, the first and second threads avoiding interaction with each
other except when explicitly requested by said program structure.

1 12. The method of claim 11 wherein the program structure comprises a library of
2 programs and further providing a function table for the space, the function table being
3 adapted to exchange services with the library in the space, and including employing
4 said first and second threads to make function calls to said function table to access
5 common data between each of the planes and common data in the space.

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1 13. The method of claim 11 wherein there is further provided a third level of
2 hierarchy comprising two or more of said spaces, the spaces containing the same or
3 different program structures, and common data accessible by the program structure
4 between each of the spaces, and including accessing the common data between each of
5 said spaces by said first and second threads.

1 14. The method of claim 13 wherein the program structure comprises a library of
2 programs and further providing a function table for each space, the function table being
3 adapted to exchange services with the library in each space, and including employing
4 said first and second threads to make function calls to said function table to access
5 common data between each of the planes and common data between each of the spaces.

1 15. A program storage device readable by a machine, tangibly embodying a
2 program of instructions executable by the machine to perform method steps for parallel
3 processing using a computer memory structure having a first level of hierarchy
4 comprising a plane, the plane containing a thread which represents an independent flow
5 of control managed by a program structure, a heap portion for data structure, a stack
6 portion for function arguments, and local variables, and global data accessible by any
7 part of said program structure; and a second level of hierarchy comprising a space, the
8 space containing two or more of said planes, the planes in the space containing said
9 program structure, the space further containing common data accessible by said
10 program structure between each of the planes, said method steps comprising:

11 employing a first thread managed by said program structure in a first plane in said
12 space and accessing data in the first plane and common data between each of the
13 planes; and
14 employing a second thread managed by said program structure in a second plane in
15 said space and accessing data in the second plane and common data between
16 each of the planes, the first and second threads avoiding interaction with each
17 other except when explicitly requested by said program structure.

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1 16. The program storage device of claim 15 wherein the program structure
2 comprises a library of programs and further providing a function table for the space,
3 the function table being adapted to exchange services with the library in the space, and
4 including employing said first and second threads to make function calls to said
5 function table to access common data between each of the planes and common data in
6 the space.

1 17. The program storage device of claim 15 wherein there is further provided a
2 third level of hierarchy comprising two or more of said spaces, the spaces containing
3 the same or different program structures, and common data accessible by the program
4 structure between each of the spaces, and including accessing the common data
5 between each of said spaces by said first and second threads.

1 18. The program storage device of claim 17 wherein the program structure
2 comprises a library of programs and further providing a function table for each space,
3 the function table being adapted to exchange services with the library in each space,
4 and including employing said first and second threads to make function calls to said
5 function table to access common data between each of the planes and common data
6 between each of the spaces.